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# Evaluation of human capital role in the value creation process

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**Abstract**

The significance of human capital in today's hyper-competitive environment is tremendous and undoubted. The aim of this study is to evaluate the role of human capital in the value creation process in the relation with other key national indicators and to assess their impact on the GDP indicator taking the case of Lithuania. The performed analysis has showed that the rate of human capital value vary in the different countries. In order to properly utilize the highly skilled human capital it is required an appropriate material economic development, within is characterized by the value of fixed assets and the materials consumed.

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*Keywords:* Human capital (HC); HC value; economic welfare; value creation process.

## 1. Introduction

Today without any doubt we accept the statements, that „now-a-days competitive advantage can only be gained with the help of the knowledge the workers have among them"(Siddiqui, 2012), that „people mean everything", „human capital is the most important capital"(Hitt, Duane, 2002). In practice, however, good results are achieved in those countries which have outstanding natural resources and high-tech material base. This does not deny the role of human capital (HC) in the process of economic development, but it must be based on the appropriate economical calculations. The impact of HC in the value creation process is widely acknowledged as an important issue (Crook & Combs and other, 2011; Coco, Jamison & Black, 2011; Baron & Armstrong, 2007; Hsu, Lin, Lawler & Wu, 2007). According to Galabova & McKie (2013), the value of resources is always dependent on knowledge, individual or managerial, and HC opens up new ways of thinking about technology and its economic and social impact.

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From a macroeconomic point of view, the OECD (2002) recognizes human capital as a primary driver of competitiveness, prosperity and economic wealth. According to Raguž, Družiü & Tica (2011), human capital in the form of education might be one of the most promising to boost sustainable economic growth. Many economic theories and growth models were developed supporting the role of human capital in the economic growth and significant number of empirical studies confirmed it. However, one of the most important issues, that have been dealt with by many authors (Doong, Fung & Wu, 2011; Chlivickas & Papšienė, 2009; Fitz-enz, 2009; Wang & Spitzer 2005; Le, Gibson & Oxley, 2003; Bontis & Fitz-enz, 2002; Piazza-Georgi, 2002), are still relevant today - how to evaluate the role of human capital in the value creation process?

If the attempts of HC evaluation at enterprise level are found in the works of, Scholz, Stein & Bechtel (2004), Baron & Armstrong (2007), Murray & Efendioglu (2007), Schwarz & Murphy (2008), AL-Ma'ani & Jaradat (2010), Mehralian, Akhavan, Rasekh & Ghatari (2013), there are practically no works that would express the HC value in monetary terms at macro level. The calculation of the HC value in monetary units would open an opportunity to solve this problem in the database of equal value units.

The aim of the study is to evaluate the role of human capital in the value creation process.

The productivity of the value creation process is determined not only by the continuous process of change, but also by the compliance of the factors involved in this process. Therefore, the evaluation of these factors is one of the most important economic challenges. Judging about the country's achieved economic results, it is important to choose an optimal situation reflecting indicators – or system of indicators. The study aims to clarify the relationship between the result achieved (Y) and its affecting factors (X1,...., Xn) presented in Eq. 1.

$$Y = f(X_1, X_2, ...X_n) \quad (1)$$

The result achieved or the country's performance is reflected by the GDP. This is one of the main indicators characterizing the country's level of economic welfare based on the final value of the goods and service over a period of time. However, even though the GDP is one of the most important measures of economic development, but it is not accurate enough estimating the economic welfare of the country and its population.

## 2. Method

In order to achieve the aim of the research, there were fulfilled some certain conditions and consistent pattern:

1. There were selected the main indicators reflecting the value creation process and the welfare of the investigated 27 EU country;
2. It has been used the logic of a production function, distinguishing the GDP as a dependent variable influenced by the economic indicators: the HC value, the gross fixed capital and the value of materials consumption in the country.
3. There was carried out a statistical research, summarizing the results of the individual EU countries according to the absolute values of the derived indices and performed a multivariate linear regression analysis correlation analysis for all the EU countries participating in the survey;
4. For the determination of the HC value in monetary units at macro level, there has been adapted the formula of Saarbruecken, applied for the calculation of the HC value at the enterprise level (Scholz, Stein & Bechtel, 2004);
5. The estimated value of HC for the individual 26 EU countries (because of the lack of statistics) allowed determining the role of HC in the value creation process, comparing the country's overall economic indicators.
6. There was performed a discrete regression models analysis by the case of Lithuania, which revealed the degree of the factors influence on the GDP increase.
7. One of the main factors limiting the study was the nomenclature and frequency of the data provided by the EU's statistics. For the calculation of production function parameters were used the statistics of the year 2010 in the investigated EU countries.

The technique of the HC value determination at macro level (read more Liepe & Sakalas, 2013) evaluates the rate of real wages at country level, the rate of knowledge depreciation and recovery, the value gain due to the motivation and the level of organization providing a systemic approach for the problem solution. The performed

calculation of the HC value unclosed an opportunity to bring together the country's main factors of productivity (GDP, gross fixed capital formation and country's material consumption value) into a uniform measurement system (in millions of Euro).

The indicator of gross fixed capital formation, including intangible assets, in the paper is reflected by the value of fixed assets (Eurostat, 2012). The materials consumption value in the country is determined using domestic material consumption rate[1] (in thousands of tons) and the country's resource productivity factor[2], which reflects the country's GDP relative to the material consumption.

## 3. Results

A performed multivariate linear regression analysis and correlation analysis for the 27 EU countries participating in the survey showed that among the analyzed parameters there is strong correlation dependence. For regression model validation there was also performed an analysis of standardized Beta coefficients and co linearity statistics analysis, which has emerged a multi-co-linearity problem. Therefore was performed an analysis of the discrete regression models in order to evaluate the impact of each independent indicator on the GDP value (Y) in the context of the EU countries and by the case of Lithuania individually. The impact of the HC value (X1) on the GDP indicator is reflected in Eq. 2.

$$Y = 5{,}817 X_1 \tag{2}$$

Suitability of the composed discrete linear regression model was tested by the normalcy of the standard residual errors in the model. In the Fig. 1 there are given relative percentage frequencies of the standard residual errors and normal random variable (called P-P plot), as well the linear regression line with a coefficient of determination (R2 = 0,748). The distribution of the EU countries (in the Fig. 1 marked by the numbers: 11 – France; 12 – Germany and so on) depending on the relation of the HC value and the GDP is quite concentrated. The coefficient of determination (74.8 percent) explains the dispersion of values obtained in relation to THE GDP, which indicates the high reliability of the estimated regression equation.

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[1] Domestic material consumption (DMC) is defined as the total amount of materials directly used on the economy (Eurostat, 2012).

[2] Resource productivity is - THE GDP divided by the amount of domestic material consumption used on the economy per year (Eurostat, 2012).

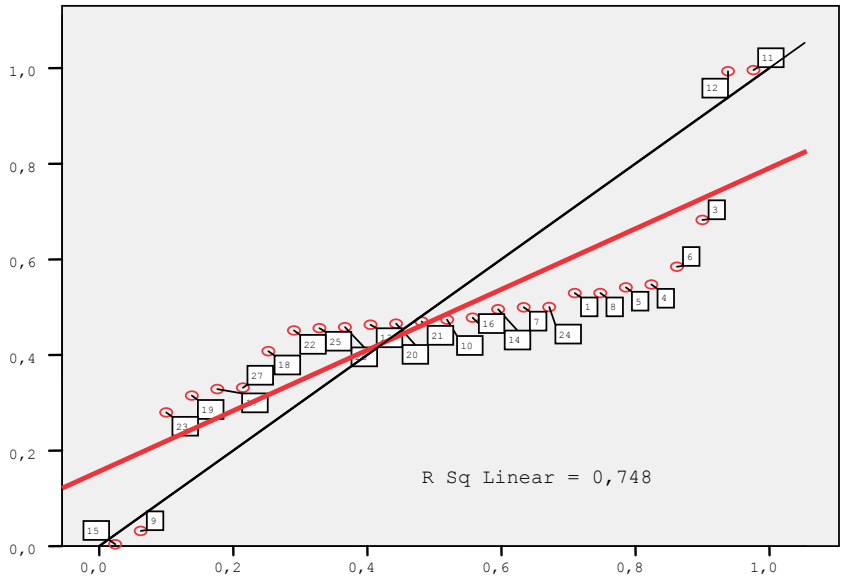


Figure 1. Influence of the HC value on the GDP in the EU countries

Identical calculations were carried out between the GDP and other two indicators - the gross fixed capital formation value (X2) and the materials consumption value (X3), and performed a regression models analysis by the case of Lithuania. The coefficients of the discrete regression equations reflected the impact of the influencing indicator increase on the GDP volume, i.e. what amount of the individual factors insertion allows increasing the GDP volume for one percent.

## 4. Discussion/Conclusions

The estimated HC value in monetary terms for the 26 EU countries (except Luxembourg, because of the lack of statistics), allowed evaluating the level of HC utilization in the value-creation process, regarding to the GDP indicator. A performed multivariate linear regression analysis and correlation analysis for all the EU countries participating in the survey revealed a strong interdependence among the analyzed parameters. A multi-co linearity problem emerged gave instability for the created models coefficients, but there can not be denied that there are high correlation coefficients among the generalizing and it's affecting factors. This suggests that all the factors in the production function have a significant impact on the gross domestic product, although their significance depends on the individual country's size and its level of development. Therefore were estimated the discrete linear regression equations for each independent variable separately and performed a regression models analysis by the case of Lithuania, which revealed the degree of the factors influence on the GDP increase. The results showed that all variables quite strongly influence the GDP indicator, but their significance is not the same – the HC value is on the second place according to the significance. It does not reduce the role of HC in value creation process - HC is the engine of all processes, but also can not be denied a quite often met straightforward claim that HC determine the economic performance. No less important are the other factors.

## References

AL-Ma'ani, A. I., & Jaradat, N. (2010). Impact of Human Capital on the Organization Performance. *Interdisciplinary Journal of Contemporary Research in Business*. *2,* 63-73.

Chlivickas, E., & Papšienė, P. (2009). *Investicijų į žmogiškąjį kapitalą svarba visuomenei.* Verslas, studijos ir aš. Šiauliai: Šiaulių kolegijos leidybos centras.

Doong, S. H., Fung, H. G., & Wu, J., Y. (2011). Are social, financial, and human capital value enhancing? Evidence from Taiwanese firms. *International Review of Economics & Finance, 20,* 395–405.

Hitt, M. A., & Duane, R. (2002). The Essence of Strategic Leadership: Managing Human and Social Capital. *Journal of Leadership & Organizational Studies, 9.*

Baron, A., & Armstrong, M. (2007). *Human capital management: achieving added value through people*. London: Kogan Page Limited.

Bontis, N. & Fitz-enz, J. (2002). Intellectual capital ROI: a causal map of human capital antecedents and consequents. *Journal of Intellectual Capital, 3,* 223 – 247.

Coco, C. T., Jamison, F., & Black, H. (2011). Connecting People Investments and Business Outcomes at Lowe's: Using Value Linkage Analytics to Link Employee Engagement to Business Performance. *People & Strategy. 34,* 28-33.

Crook, T. R., Combs, J. G., Todd, S. Y., Woehr, D. J., & Ketchen Jr., D. J. (2011). Does Human Capital Matter? A Meta-Analysis of the Relationship Between Human Capital and Firm Performance. *Journal of Applied Psychology. 96,* 443.

Eurostat (2010). Europos komisijos „Eurostat:" informacija. [interaktyvus]. - [žiūrėta 2012-03-11]. Retrieved from: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=mny_stk_mcp_a&lang=en OECD: 1996, The Knowledge-Based Economy (Publication Services OECD, Paris).

Fitz-enz, J. (2009). *The ROI of Human Capital: Measuring the Economic Value of Employee Performance.* New York, Amacom.

Galabova, L. & McKie, L. (2013). The five fingers of my hand: human capital and well-being in SMEs. *Personnel Review. 42 6,* 662-683.

Hitt, M. A., & Duane, R. (2002). The Essence of Strategic Leadership: Managing Human and Social Capital. *Journal of Leadership & Organizational Studies, 9, 1.*

Hsu, I. C., Lin, Y. Y., Lawler, J. J., & Wu, S. H. (2007). Toward a Model of Organizational Human Capital Development: Preliminary Evidence from Taiwan. *Asia Pacific Business Review, 13,* 251-275.

Le, T., Gibson, J., & Oxle, L. (2003). Cost- and Income-based Measures of Human Capital. *Journal of* Economic Surveys. 17,271–307.

Liepė, Ž. & Sakalas, A. (2013). Determination of human capital value at macro level. *Economics and management = Ekonomika ir vadyba, 18* 296-304.

Mehralian, G., Akhavan, P., Rasekh, H. R., & Ghatari, A. R. (2013). A framework for human capital indicators in knowledge- based industries: evidence from pharmaceutical industry. *Measuring Business Excellence, 17,* 88-101.

Murray, L. W., & Efendioglu, A. M. (2007). Valuing the investment in organizational training. *Industrial and Commercial training*, *39,* 372-379.

OECD (2002). [interaktyvus]. Education Policy Analysis [žiūrėta 2012-08-05]. Prieiga per internetą: www.erzwiss.uni-hamburg.de/personal/.../oecd-edu-pol-2002.pdf.

Piazza-Georgi, B. (2002). The role of human and social capital in growth: extending our understanding. *Cambridge Journal of Economics, 26,* 461-479.

Raguž, I., Druži I., & Tica, J. (2011). Human Capital in Growth Accounting: the case of Croatia. *Journal of International Scientific Publications: Educational Alternatives,9.*

Schwarz, J. L., & Murphy, T. E. (2008). Human capital metrics: an approach to teaching using data and metrics to design and evaluate management practices. *Journal of management education, 32,* 164-182.

Scholz, Ch., Stein, V., & Bechtel, R. (2004). Human Capital Management. Wege aus der Unverbindlichkeit Walters Kluwer Deutschland GmBH, Munchen. Unterschleisheim.

Siddiqui, F. (2012). Human Capital Management: An Emerging Human Resource Management Practice. *International Journal of Learning & Development.*

Wang, G. G., & Spitzer, D. R. (2005). Human Resource Development Measurement and Evaluation: Looking Back and Moving Forward. *Advances in Developing Human Resources, 7,* 5-15.